

IN THE SPECIFICATION:

Please replace paragraph number [0001] with the following rewritten paragraph:

[0001] This application is a continuation of application Serial No. 09/920,255, filed August 1, 2001, ~~pending now U.S. Patent 6,610,162 B1, issued August 26, 2003~~, which is a continuation of application Serial No. 08/908,425, filed August 7, 1997, now U.S. Patent 6,277,225 B1, issued August 21, 2001, which is a divisional of application Serial No. 08/614,618, filed March 13, 1996, abandoned in favor of application Serial No. 08/908,425, filed August 7, 1997.

Please replace paragraph number [0008] with the following rewritten paragraph:

[0008] While many variations of the three major components are known in the art, the focus of the present invention resides ~~in~~ on the filler materials employed and their effects on the active die surface and improved lead locking of the lead fingers of the frame.

Please replace paragraph number [0015] with the following rewritten paragraph:

[0015] From the foregoing, the prior art has neither provided for improved locking of the lead fingers to the semiconductor die, nor recognized the stress phenomenon attendant to transfer molding and the use of filled encapsulants, nor provided ~~an~~ a LOC structure which beneficially accommodates this phenomenon.

Please replace paragraph number [0016] with the following rewritten paragraph:

[0016] The present invention provides a lead-supported die assembly for ~~an~~ a LOC arrangement that substantially reduces the stress that may otherwise potentially form between the leads and the active die surface due to the presence of filler particles of the polymer encapsulant and improved lead locking of the leads in position over a portion of the active surface of a semiconductor die assembly. Accordingly, each lead of the lead frame between the bonding location of the die and the edge of the die is formed with a stress relief portion therein. The

resulting enlarged volume of space between the leads and the active die surface will beneficially accommodate an increased amount of the underlying filler particle or particles of the polymer encapsulant. Accordingly, a stacking of filler particles in which the filler particles try to force the lead away from the die, thus causing stress in the connection between the lead and the die, is less likely to occur. Moreover, this stress relief portion allows flexibility in bending and torsion in the leads due to stress created during the transfer molding process as well as other processes. The resulting lead flexure in response to the filler material will produce an immediate reduction in the residual stress experienced by the active die surface. This lessened residual stress is carried forward in the encapsulated package after cure, permitting the package to better withstand the stresses of post-encapsulation handling and testing, including the elevated potentials and temperatures experienced during burn-in, without adverse effects. The resulting lead flexure also allows improved lead finger locking to the tape as less force is transferred to the tape from the flexure of the lead fingers, which force may cause the lead fingers to become dislodged therefrom prior to the wire bonding operations or, subsequently, during encapsulation of the assembly.

Please replace paragraph number [0017] with the following rewritten paragraph:

[0017] The LOC apparatus of the present invention comprises a lead frame to which the active surface of a die is adhered by an a LOC tape, permitting the lead frame to physically support the die during pre-encapsulation handling and processing such as wire bonding. The free ends of the leads have a recessed portion formed therein extending over a longitudinal length of the lead end proximate the active surface of the die. With such an arrangement, intrusion of filler particles between the inner lead ends and the active surface of the die during the encapsulation process is beneficially accommodated.

Please replace paragraph number [0030] with the following rewritten paragraph:

[0030] So that the reader may more fully understand the present invention in the context of the prior art, it seems appropriate to provide a brief description of a transfer apparatus

and method for forming a plastic package about ~~an~~ a LOC die assembly. The term “transfer” molding is descriptive of this process as the molding compound, once melted, is transferred under pressure to a plurality of remotely-located mold cavities containing die assemblies to be encapsulated.

Please replace paragraph number [0040] with the following rewritten paragraph:

[0040] FIGS. 8A and 8B depict views of the lead frame and associated die in accordance with the present invention. For purposes of clarity and perspective, the inner, solid line 220 in FIG. 8A is the periphery of the die onto which the lead frame is superimposed and to which the lead frame is adhesively secured. In FIGS. 8A and 8B, double-dashed line 200 is the outer lateral border of the plastic package to be molded on each lead frame. In FIG. 8A, dashed line 210 represents the portion of the lead ends 122 that are typically plated. The periphery of the adhesive segments disposed between certain leads or buses and the die are represented by inner, solid lines 240. Further, the portion of each lead member that has a stress relief portion formed therein, as described below, is represented by dotted lines 250 in FIG. 8A and cross-hatched for purposes of clarity in FIG. 8B. For purposes of illustration, the semiconductor die as illustrated comprises memory devices, such as dynamic random access memory (DRAM), or static random access memory (SRAM), although the invention has equal utility to any semiconductor device wherein ~~an~~ a LOC arrangement is employed.

Please replace paragraph number [0042] with the following rewritten paragraph:

[0042] As illustrated in FIGS. 9 and 10, the recess 113 may be of various sizes and configurations and be located in a variety of positions along the lead 112. In ~~FIG~~ FIG. 9, the recess portion 113 extends a relatively small distance into the lead 112, forming a substantially rectangular slot. Moreover, the side wall 153 of the recess is substantially coincident with the outer edge 115 of the die 102. In comparison, the recess 113 shown in FIG. 10 extends farther in depth into the lead 112, forms a substantially trapezoidal slot and has an angled side wall 155 extending a distance away from the outer edge 115 of the die 102. Additionally, the angled side

wall 157 forming one side of the slot may be adjacent the edge 159 of the adhesive strip 152, as shown in FIG. 10, or extend beyond the edge 159, as shown in FIG. 9. In any case, the size and shape of the recess 113 may vary according to the process used to form such a recess. For example, such etching may form a recess 113 similar to that shown in FIG. 10 and machining may form a recess similar to that in FIG. 9. The improved flexibility of the lead 112 due to recess 113 enhances the lead locking ability of the adhesive strips or segments 152.

AMENDMENTS TO THE ABSTRACT:

Please replace the Abstract originally appearing on page 20 of the application with the following rewritten paragraph:

ABSTRACT OF THE DISCLOSURE

An LOC die assembly is disclosed including a die dielectrically adhered to the underside of a lead frame. The lead frame has stress relief slots formed in the undersides of the lead elements proximate the adhesive to accommodate filler particles lodged between the leads and the active surface of the die during transfer molding of a plastic encapsulant. The increased space created by the slots and flexure in the leads about the slots reduces point stresses on the active surface of the die by the filler particles. The increased flexure in the leads about the slots further enhances the locking of the leads in position with respect to the die.